

FHWA R&T Now

A news update of research, technology, and development from the U.S. Department of Transportation (USDOT), Federal Highway Administration (FHWA)

September/October 2017

POLICY & PARTNERSHIPS

Four Task Forces Established at SCOR Meeting

FHWA's Office of Innovative Program Delivery and Office of Research, Development, and Technology recently participated in a planning meeting held by the American Association of State Highway and Transportation Officials (AASHTO) Standing Committee on Research (SCOR). The meeting resulted in the establishment of four task forces—Allocation of Funds, Return on Investment, Accelerate Research, and Innovation—aimed at improving the committee's business processes. These task forces will report their recommendations to the full committee in December 2017. As part of the AASHTO reorganization, SCOR will now be known as the Special Committee on Research and Innovation. The change is intended to emphasize an increased focus on implementing research products. SCOR, which oversees the National Cooperative Highway Research Program (NCHRP), acts as AASHTO's driving force for high-quality transportation research and innovation to improve the Nation's mobility of people and goods. Its mission is to support AASHTO and the transportation community by delivering strategic, high-quality research results while addressing development, technology transfer, and implementation.

SCOR's responsibilities are to:

- Encourage and assist other AASHTO committees and subcommittees to identify research needs, define research emphasis areas, and utilize research findings.
- Solicit research problem statements from the member departments, AASHTO committees, and FHWA; screen the submittals; prioritize them; and recommend annual NCHRP programs for consideration by AASHTO's Board of Directors.
- Monitor the Transportation Research Board's performance as program manager for the NCHRP.
- Monitor the NCHRP and make appropriate recommendations and reports to AASHTO.
- Review, observe, and encourage the effective use of research funding, and recommend appropriate funding levels.
- Serve as a forum, coordinating committee, and advocate for highway and other transportation research on behalf of AASHTO and its member departments.
- Review, monitor, and foster coordination of the various national programs of highway research and other transportation research.
- Foster the role of industry in highway research and other transportation research.

For more information, contact Jack Jernigan, 202-493-3363, jack.jernigan@dot.gov.



EXPLORATORY ADVANCED RESEARCH

Three-Truck Platoons Demonstrated on I-66

On September 14 and 15, 2017, FHWA hosted a demonstration of three-truck platoons on Interstate 66 in Centreville, Virginia. The demonstration was the culmination of a 4-year FHWA Exploratory Advanced Research (EAR) project to test the effectiveness of state-of-the-art driving and communications technologies. Those who attended the event had the opportunity to ride inside the trucks and experience these technologies firsthand.



Professional drivers operated the trucks, which were partially automated.

While various aspects of truck platooning have been studied for years, FHWA's EAR program has taken testing to new levels with the addition of cooperative adaptive cruise control (CACC) technology and the incorporation of a third truck in the platoon. CACC adds vehicle-to-vehicle communications to the adaptive cruise control capability now available in new vehicles. This connectivity allows trucks to operate more smoothly as a unit, reducing and controlling the gaps between vehicles.



A three-truck platoon using CACC technology.

The demonstration involved partially automated trucks (which are not driverless) and used professional drivers. The driver continued to steer the truck while the truck platooning system controlled the throttle and brakes. The advanced technology that makes platooning possible is meant to supplement, not replace, the Nation's commercial motor vehicle operators.

Key benefits of truck platooning are reduced fuel costs and increased road efficiency while maintaining safety. The demonstration was conducted with EAR project partners, including the California department of transportation (DOT), California PATH Program, and Volvo trucks, as well as local partners including the Virginia DOT, Virginia State Police, Fairfax County Police, Prince William County Police, and Fairfax County Parks Authority.

For more information about the demonstration or truck platooning, contact Osman Altan, 202-493-3391, osman.altan@dot.gov.

EAR Program Releases Fact Sheets on Three Projects

The EAR Program has released fact sheets that describe projects focused on assessing structural health, expanding freight capacity, and adaptive highway bridge bearings.

"Assessing the Structural Health of America's Highway Bridges Effective Wireless Sensor Systems to Monitor Structural Health and Detect Damage" (FHWA-HRT-17-043) highlights EAR-funded research to develop self-powered wireless sensors that can monitor structural health or assess bridge conditions. The fact sheet discusses a collaborative effort between Michigan State University, Washington University in St. Louis, and the University of Southern California focused on an ultra-low power wireless sensing system. Drexel University researchers are also developing a suite of portable wireless sensors to provide important baseline data on structural health.



These sensors can be installed as needed to assess damage from floods, accidents, or similar incidents that might compromise structural integrity.

“Expanding the Freight Capacity of America's Highways Platooning and Connectivity to Increase Efficiency” (FHWA-HRT-17-045) discusses EAR-funded research that will enable long-distance trucks to travel together more efficiently. The fact sheet highlights research to develop technology and strategies that allow two and three trucks to travel close together in “platoons,” using advanced sensors and connected vehicle technologies to maximize efficiencies. Auburn University (in partnership with Peterbilt Truck, American Transportation Institute, Peloton Technology, and Meritor, Inc.) and the University of California, Berkeley’s Partners for Advanced Transportation Technology program (in partnership with Volvo Technologies of America and Cambridge Systematics) are involved in this effort.

“Adaptive Highway Bridge Bearings Towards Intelligent Infrastructure Systems” (FHWA-HRT-17-046) describes EAR-funded research aimed at self-sensing adaptive material for a new generation of multifunctional bridge-bearing systems. The research, conducted by the University of Nevada, Reno, is part of a 3-year inquiry into developing responsive smart materials for bridge components.

For more information, contact David Kuehn, 202-493-3414, david.kuehn@dot.gov.

INFRASTRUCTURE

FHWA Advances Pavement Friction Assessment

FHWA is currently in the second phase of a project with Virginia Tech to advance the assessment of pavement friction, which can help a vehicle stop or maneuver its way out of a crash. The work involves collaborating with Florida, Indiana, Texas, and Washington to assess the value of continuous friction measurement with state-of-the-practice safety

analysis methodologies as part of an effort to develop pavement friction management programs.

The Sideways Coefficient Routine Investigatory Machine (SCRIM)—which is designed to measure friction, cross-slope, macro-texture, grade, temperature, and curvature—has been used to test approximately 700 miles of pavement in each of these States. The results will be correlated to measurements taken with each State’s locked wheel skid trailer, and compared to crash histories to develop criteria and pavement friction management programs.

In the first phase of the project, a report on theoretical relationships and a report on equipment recommendation was produced to assess available friction devices. In 2015, FHWA took delivery of the SCRIM, which was evaluated at the Virginia Smart Road, a full-scale, closed test-bed research facility managed by the Virginia Tech Transportation Institute.

An analysis of results is underway and a draft report is expected next year. Each participating State will receive an analysis of data and an assessment of the value analysis of using safety analyses within pavement friction management programs that consider continuous pavement friction and texture data, road geometrics, and crashes rates. Discussions are underway to allow additional States the opportunity to conduct SCRIM testing via a pooled fund study.

For more information, contact Katherine Petros, 703-493-3154, katherine.petros@dot.gov, or Andy Mergenmeier, 667-239-0879, andy.mergenmeier@dot.gov.

Hundreds Attend Webinars on Concrete

FHWA recently held a webinar on controlling the cracking of concrete in bridges and a series of webinars that covered a suite of deployable solutions related to the use of ultra-high performance concrete. The webinar on concrete cracking, which covered the NCHRP Synthesis Report 500, was attended by an estimated 621



people across 335 sites. The ultra-high performance concrete webinars (six were held between March and August 2017) were part of FHWA's Every Day Counts initiative and attended by at least 900 registered sites, many of which supported multiple attendees.

FHWA's Ben Graybeal and Mark Leonard assisted in the development and delivery of the ultra-high performance concrete webinars. For the webinar on concrete cracking, Graybeal also moderated the technical content delivery and led the question-and-answer session that followed.

To view the presentation slides, the NCHRP report, and a recording of the webinar on concrete cracking, visit <http://www.trb.org/ElectronicSessions/Blurbs/176209.aspx>. To access recordings of the ultra-high performance concrete webinars, visit https://www.fhwa.dot.gov/innovation/everydaycounts/edc_4/uhpc_webinar_recording.cfm.

For more information, contact Ben Graybeal, 202-493-3122, benjamin.graybeal@dot.gov.

FHWA Participates in ACI Strategic Development Council Forum

FHWA recently participated in the American Concrete Institute (ACI) Strategic Development Council Technology Forum, which brought together researchers and engineers in the public and private sectors and professionals in academia. Ben Graybeal, who leads FHWA's bridge engineering research team, delivered a lecture on the current state of ultra-high performance concrete, offering insights on field advancements and expected progress in the future. Richard Meininger, a highway research engineer at FHWA, helped to coordinate a tour of Turner-Fairbank Highway Research Center (TFHRC). Michael Praul, a senior concrete engineer, spoke about performance engineered concrete mixes. David Kuehn, who manages FHWA's EAR Program, and Jonathan Porter, who serves as chief scientist at TFHRC, took part in a

roundtable focused on achieving acceptance for new materials.

For more information, contact Ben Graybeal, 202-493-3122, benjamin.graybeal@dot.gov.

OPERATIONS

Urban Congestion Trend Report Available

FHWA's annual report on urban congestion trends, "Using Technology to Measure, Manage, and Improve Operations" (FHWA-HOP-17-010), is now available. The report provides annual congestion and reliability measure trend information as well as highlights evaluations of successful operations strategies. "Overall, congestion has remained relatively flat, increasing by 3 minutes from 4:40 hours in 2015 to 4:43 hours in 2016," it states. The report is available to download at <https://ops.fhwa.dot.gov/publications/fhwahop17010/fhwahop17010.pdf>.

For more information, contact Rich Taylor, 202-366-1327, rich.taylor@dot.gov.

SAFETY

OSU Students Win HSIS Excellence in Highway Safety Data Award

Two students from Oregon State University recently received the 2017 Highway Safety Information System (HSIS) Excellence in Highway Safety Data Award for their paper, "Heavy Vehicle Driver Injury Severity Analysis by Time of Week: A Mixed Logit Approach Using HSIS Crash Data."

"This year's winning paper focuses on heavy vehicle driver injuries and demonstrates an innovative use of HSIS data," said Michael Trentacoste, FHWA's Associate Administrator for Research, Development and Technology. "It exemplifies the goal of the awards program—to inspire university students to use HSIS data to investigate a topic that advances highway safety—and we hope these young researchers



will continue exploring important transportation safety challenges.”

HSIS

HIGHWAY SAFETY INFORMATION SYSTEM

FHWA’s HSIS is a multi-State database that contains statistics on crashes, roadway inventories, and traffic volumes. Researchers and policymakers can use these data to analyze such factors as the geometric design of roadways, the selection and placement of roadside hardware, the use of traffic control measures, the size and performance capabilities of vehicles, and the needs and abilities of highway users.

In July, the authors, Jason Anderson and Shangjia Dong, were recognized at the Joint Institute of Transportation Engineers (ITE)/Canadian ITE 2017 Annual Meeting and Exhibit in Toronto, Canada. Their paper is published in the September 2017 issue of ITE Journal, which is available at www.ite.org/itejournal.

Part of the Highway Data Analysis Excellence Awards Program, the HSIS Excellence in Highway Safety Data Award was created to introduce future highway safety professionals to HSIS safety data, to the application of appropriate research methods to derive recommendations, and to the practice of using data to make decisions. The competition is jointly administered by the FHWA and ITE, an association focused on improving mobility and safety in transportation and helping to build smart and livable communities.

For more information about FHWA’s HSIS, visit <https://www.hsisinfo.org/>, or contact Carol Tan, 202-493-3315, carol.tan@dot.gov.

IHSDM 2017 Boasts Economic Analyses Tool

FHWA recently released the 2017 version (13.0.0) of the Interactive Highway Safety Design Model (IHSDM), a suite of software analysis tools for evaluating safety and operational effects of project-level geometric design decisions on highways. The new version features an Economic Analyses (EA) Tool that allows users to conduct economic analyses within IHSDM, using Crash Prediction Module evaluation results (crash frequencies and severities). The initial version of the IHSDM EA Tool applies to freeways and will be expanded to include all facility types covered by Part C of the Highway Safety Manual. The software is available to download for free on the IHSDM website, www.ihsdm.org, which includes information related to case studies, past webinar materials, and frequently asked questions.

IHSDM, which supports the Data-Driven Safety Analysis initiative that is part of FHWA’s Every Day Counts 3 efforts, includes six evaluation modules applicable to rural two-lane highways: crash prediction, design consistency, intersection review, policy review, traffic analysis, and driver/vehicle. The crash prediction module serves as a faithful implementation of the American Association of State Highway and Transportation Officials’ Highway Safety Manual, Part C: Predictive Methods. The module deals with two-lane rural highways, multilane rural highways, urban and suburban arterials, freeways and ramps/interchanges.

On November 1, 2017, a webinar will be held from 1 to 2:30 p.m. (eastern daylight time) to introduce the new IHSDM release. For further details, visit www.ihsdm.org. IHSDM training courses are available through the National Highway Institute. For a 2-day, onsite training course, visit www.nhi.fhwa.dot.gov/training/course_search.aspx?tab=0&key=IHSDM&sf=0&course_no=380071. For a Web-based, instructor-led course, visit www.nhi.fhwa.dot.gov/training/course_sea



[rch.aspx?tab=0&key=IHSDM&sf=0&course_no=380100](#). IHSDM technical support is available at IHSDM.Support@dot.gov and 202-493-3407.

National Highway Institute:
www.nhi.fhwa.dot.gov/home.aspx

For more information, contact Abdul Zineddin, 202-493-3288, abdul.zineddin@dot.gov.

Please forward this newsletter to others you think might find it interesting and/or useful. Suggestions may be submitted to: FHWA_Now@fhwa.dot.gov.

RECENT PERIODICALS

Public Roads—July/August 2017

This issue includes: Transforming Stewardship and Oversight for Major Projects; The Age of e-Construction; ITS Is Changing the World; Dollar for Dollar; Help Wanted; and A Focused Approach to Pedestrian and Bicycle Safety.

It is available online via www.fhwa.dot.gov/publications/publicroads/17julaug/index.cfm.

For more information, contact Lisa Shuler, lisa.a.shuler@dot.gov.

Innovator: Accelerating Innovation for the American Driving Experience—September/October 2017

This issue includes: The Math Proves the Savings in Pavement Preservation Strategies; Community Connections; From New Approach to Everyday Practice; Missouri Celebrates a Decade of Innovative ‘Plays’; Get Information on State Innovation at Your Fingertips; and States Innovate!

The issue is available online via www.fhwa.dot.gov/innovation/innovator/issue62/3dIssue/.

LINKS

Turner-Fairbank Highway Research Center:
www.fhwa.dot.gov/research/

Resource Center:
www.fhwa.dot.gov/resourcecenter/

